

(12) UK Patent Application (19) GB (11) 2 211 506 (13) A
(43) Date of A publication 05.07.1989

(21) Application No 8725046.0

(22) Date of filing 26.10.1987

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(51) INT CL⁴
F16L 47/00 37/16

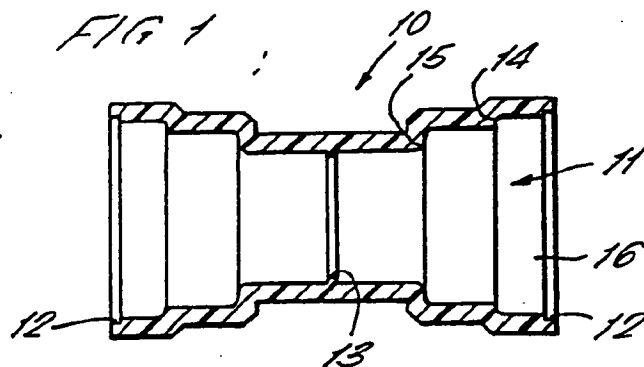
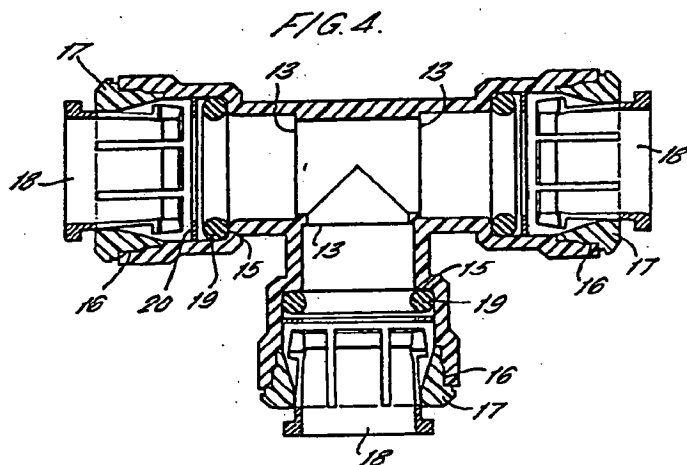
(52) UK CL (Edition J)
C3V VED
C3W W323 W330
F2G G111 G31 G31B
U1S S1885 S1976 S1978

(56) Documents cited
None

(58) Field of search
UK CL (Edition J) C3V VED VEK VEX

(54) Tube coupling bodies

(57) The disclosure relates to a tube coupling body (10) having a bore (11) extending between upon ends (12), a central rib or ridge (13) and one or more stepped reductions, (14, 15) in the outer diameter of the coupling body, with the wall thickness of the body being substantially uniform throughout. The body is formed as an injection moulding of a polysulphone plastics material so as to be inert to domestic tap water and thus is suitable for use in domestic water installations. A coupling (see Fig 4) incorporating such coupling body in the form of a TEE connector includes insert sleeves (17) secured in the open ends of the body having cam surfaces in which collets (18) are engageable to receive and lock tubing, with "O" ring seals (19) being located against steps (15).



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FIG. 1.

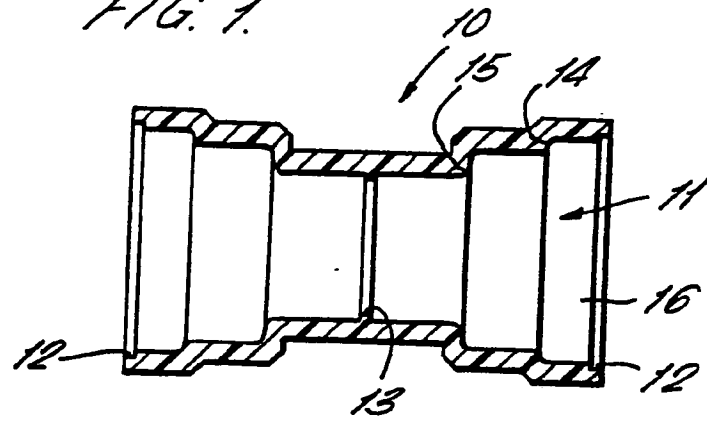
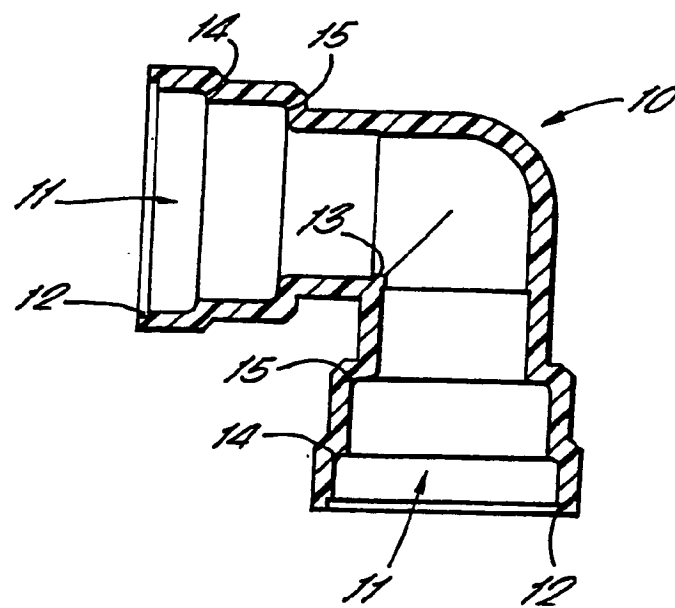


FIG. 2.



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FIG. 3.

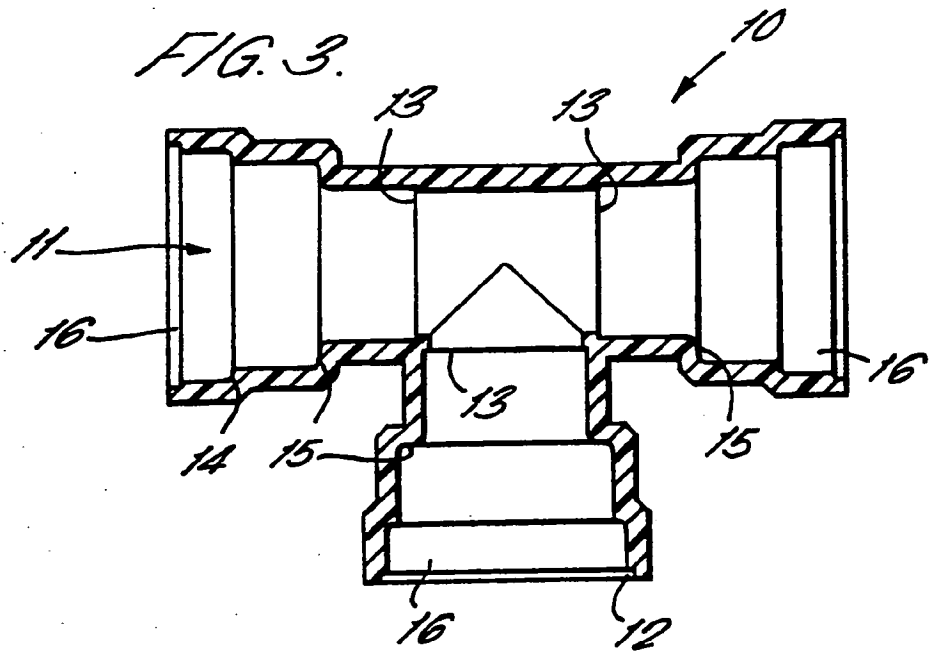
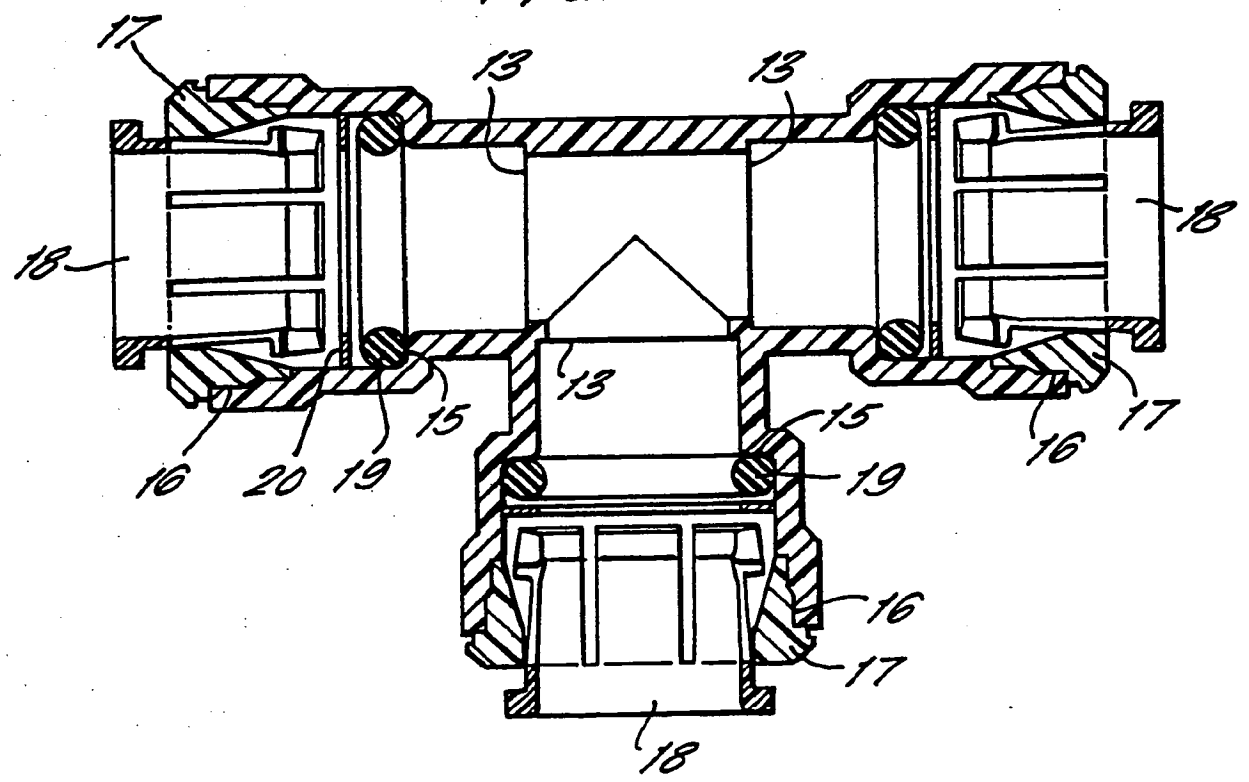


FIG. 4.



IMPROVEMENTS IN OR RELATING TO TUBE COUPLING BODIES

5 This invention relates to tube coupling bodies
for tube couplings of the type in which the coupling
body has a throughway open at one end to receive a
tube with a internal tapered cam surface converging
towards the open end of the body in which a collet is
disposed with resilient arms which engage the tapered
cam surface to be forced inwardly thereby to grip and
10 hold a tube in the body. One such coupling body is
described and illustrated in our U.K. Patent No.
1520742. Hitherto such couplings have been
developed for a wide variety of applications
including pneumatic and fluid systems but suitable
15 couplings have not been available for plumbing and
heating applications involving potable water, hot
water for domestic use and hot water for heating
purposes.

20 The invention provides a tube coupling body
having a bore extending into the body from an open
end thereof, one or more stepped reductions in the
diameter of the bore between said open end and said
end, a corresponding reduction or reductions in the
25 diameter of the outer surface of the body whereby the
wall thickness of the body is substantially uniform
throughout and the body being formed as an injection
moulding in a polysulphone plastics material.

30 The combination of a polysulphone plastics
material for the coupling body with a more uniform
thickness for the coupling body throughout combines
the requisite properties of an inert material with
respect to the water passing there through which has
35 an adequate life expectancy of service and in which,
by virtue of the uniform wall thickness, minimising

residual stresses in the body.

The following is a description of some specific embodiments of the invention, reference being made to the accompanying drawings in which:

Figure 1 is a sectional view of one form of tube coupling body according to the invention;

Figures 2 and 3 are sections through further forms of tube coupling bodies; and

Figure 4 is a section through a complete form of coupling embodying the coupling body of Figure 3.

Referring firstly to Figure 1 of the drawings, there is shown a tube coupling body indicated generally by the reference numeral 10 for a tube coupling the type described and illustrated in our U.K. Patent No. 1520742. The coupling body illustrates generally cylindrical form produced as an injection moulding in polysulphone plastics. The body has a bore 11 extending through the body between open ends 12 at opposite ends of the body. At the centre of the body the bore has an encircling integral rib 13 which forms an end for the ends of the two tubes to be inserted into the body through the openings 12 at either end thereof.

Between each open end 12 of the body and the central ridge 13 the bore reduces in diameter at based steps 14 and 15. The external cylindrical surface of the body has corresponding steps reducing the external diameter of the body whereby the wall thickness of the body is substantially uniform throughout. This minimises the effect of stresses imposed in the plastics material of the body in the moulding operation and in subsequent heating and

cooling of the body by virtue of materials conducted through the body.

5 The part 16 of the body between the open end 12 and step 14 receives an insert sleeve formed with a tapered cam surface converging towards the open end of the body and the sleeve is secured in the bore by ultrasonic welding to form a integral structure with the bore. The tapered cam surface acts on the
10 resilient arms of a collet located in the end of the coupling body to lock a tube in the body. An "O" ring seal is located against the step 15 in the body to seal with a tube extending through the bore.

15 Figure 2 of the drawing shows a similar arrangement in which the body is formed with the right angle bend to provide elbow connector it would be appreciated in this case the ridge formed at the
20 centre of the body extends around the full bend of the elbow.

 Figure 3 of the drawings shows a further variation in which the coupling body 10 is in the form of a TEE connector with three walls extending
25 into the coupling body to receive three tubes to be connected therein.

 Figure 4 shows the coupling body of Figure 3 with the aforesaid insert sleeves designated 17
30 located at the open ends of the coupling body, the collet 18 in place in the open ends of the body and the "O" ring seals 19 located against the steps 15. In addition annular washers 20 are provided adjacent the seals and formed from polysulphone plastics to
35 remove any extraneous matter from the outer surfaces of the tubes prior to entry into the "O" ring seals.

CLAIMS

1. A tube coupling body having a bore
extending into the body from an open end thereof, one
5 or more stepped reductions in the diameter of the
bore between said open end and said end, a
corresponding reduction or reductions in the diameter
of the outer surface of the body whereby the wall
thickness of the body is substantially uniform
10 throughout and the body being formed as an injection
moulding in a polysulphone plastics material.

2. A tube coupling body as claimed in Claim
1, wherein the body has at least two spaced stepped
15 reductions in diameter between the open end of the
body and the tube end, the portion of the bore
between the first step and open end of the body
providing a socket for receiving a cam sleeve to be
integrated with the wall of the body within which a
20 collet for gripping a tube may be located and the
portion of the bore between the two steps being
intended to be a sealing ring for sealing engagement
with the tube to be received in the body.

3. A coupling body as claimed in Claim 1 or
Claim 2, wherein the body has a plurality of such
bores which communicate within the body between the
25 respective end stops of the bores.

4. A tube coupling as claimed in Claim 3,
30 wherein the body has two such bores.

5. A tube coupling as claimed in Claim 4
wherein the bores a coaxial extending into the tube
35 coupling from opposite ends thereof, the coupling
having a cylindrical central portion within which

there is a encircling ridge defining end stops facing in opposite directions along the bore for the tube ends to be inserted into the bore.

5 6. A tube coupling as claimed in Claim 4, wherein the axis of the bores extend into the coupling body at right angles to one another whereby the body is in the form of an elbow.

10 7. A tube coupling as claimed in Claim 3, wherein the body has three such bores extending into the body from respective open ends whereby the coupling body provides a TEE connector.

15 8. A coupling body as claimed in any preceding claims, wherein an insert sleeve is located in the or each bore adjacent the open end thereof and is integrally connected with the encircling wall of the body, the insert sleeve having a tapered cam
20 surface converging towards the end of the body to receive a collet having resilient arms to be engaged by the cam surface to cause the arms to deflect inwardly and grip the tube within the bore.

25 9. A tube coupling body substantially as described with reference to and as illustrated in Figure 1, Figure 2, Figures 3 and 4 in the accompanying drawings.

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